Name ______________________ Student Number ______________

All solutions are to be presented on the paper in the space provided. The quiz is open book. You can discuss the problem with others and ask the TA questions.

(1) Use the point–slope form to write the equation of the line through $(2, -1)$ parallel to $2x + 3y = 1$.
Solve for y to get the slope:

$$3y = -2x + 1$$
$$y = -\frac{2}{3}x + \frac{1}{3}$$

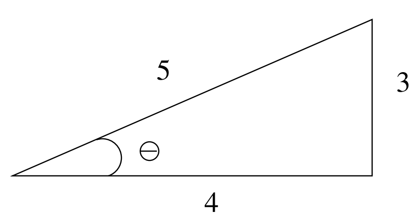
This is now in slope–intercept form, so the slope is simply read from the equation as $m = -\frac{2}{3}$.

The point slope form is $y - y_0 = m(x - x_0)$, so with $(x_0, y_0) = (2, -1)$, the equation of the line is

$$y - (-1) = -\frac{2}{3}(x - 2)$$
$$y = -\frac{2}{3}x + \frac{1}{3}$$

(2) If $\tan\theta = \frac{3}{4}$, $\theta \in \left(\pi, \frac{3\pi}{2}\right)$, what are the other trigonometric ratios?

The triangle shown has the correct side lengths. Since θ is in



quadrant III, the other trigonometric functions are

$$\sin\theta = -\frac{3}{5} \qquad \cos\theta = -\frac{4}{5}$$
$$\csc\theta = -\frac{5}{3} \qquad \sec\theta = -\frac{5}{4} \qquad \cot\theta = \frac{4}{3}$$

Over→

(3) Solve the equation $|\tan x| = 1$.
The equation breaks up into two separate equations:

$$\tan x = 1 \qquad \text{or} \qquad \tan x = -1$$

which has solutions

$$x = \frac{\pi}{4},\ \frac{5}{4}\pi \qquad \text{or} \qquad x = \frac{3}{4}\pi,\ \frac{7}{4}\pi$$

However, since there is no condition on x, all multiples of 2π must be added to each solution. Do this for a couple of positive and negative multiples of 2π for each solution and you will see that the total solution set is all odd multiples of $\frac{\pi}{4}$. That is $x = (2n+1)\frac{\pi}{4}$, for n any integer.

(4) Solve $\sin x > \frac{1}{2}$
$\sin x = \frac{1}{2}$ for $x = \frac{\pi}{6},\ \frac{5}{6}\pi$. Since $\frac{\pi}{2}$ is between $x = \frac{\pi}{6}$ and $\frac{5}{6}\pi$, and since $\sin\left(\frac{\pi}{2}\right) = 1$, $\sin x > \frac{1}{2}$ when $x \in \left(\frac{\pi}{6}\,,\ \frac{5}{6}\pi\right)$.

There is no condition on x, so shifting the interval by multiples of 2π in the positive and negative directions will also be solution sets. The solution is therefore, for n an integer,

$$x \in \left(\frac{\pi}{6} + 2n\pi\,,\ \frac{5}{6}\pi + 2n\pi\right)$$

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